
FoxO3 regulates neural stem cell homeostasis.

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Public Summary:

In the nervous system, neural stem cells (NSCs) are necessary for the generation of new neurons and for cognitive function. Here we show that FoxO3, a member of a transcription factor family known to extend lifespan in invertebrates, regulates the NSC pool. We find that adult FoxO3(-/-) mice have fewer NSCs in vivo than wild-type counterparts. NSCs isolated from adult FoxO3(-/-) mice have decreased self-renewal and an impaired ability to generate different neural lineages. Identification of the FoxO3-dependent gene expression profile in NSCs suggests that FoxO3 regulates the NSC pool by inducing a program of genes that preserves quiescence, prevents premature differentiation, and controls oxygen metabolism. The ability of FoxO3 to prevent the premature depletion of NSCs might have important implications for counteracting brain aging in long-lived species.

Scientific Abstract:

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